

The bee fauna (Hymenoptera: Apoidea) of southeastern Washington

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ABSTRACT

A survey of the species composition, distribution, and host plants of bees (Hymenoptera: Apoidea) was conducted in the Snake River area, the Colton area, and the Moscow Mountain area of southeastern Washington. Nineteen genera and 100 species occurred in the three areas. The number of species found in each family were: 1 Colletidae; 11 Halictidae; 31 Megachilidae; 27 Adrenidae; 15 Anthophoridae and 15 Apidae. Location and flowers visited are listed for each species.

Key words: bees, Hymenoptera, Apoidea, bee fauna, Washington State

INTRODUCTION

There are no published faunal studies of bees in Washington despite their importance in pollination and their high priority with respect to conservation of biodiversity (Williams *et al.* 1993). Most information on the native bee species occurring in Washington is difficult to access because it is in various systematic works dealing with particular taxa (families, genera).

Bee studies in Washington have, in many cases, been concerned with the role of bees as pollinators of commercial crops. Menke (1952) listed a number of genera of Apoidea associated with apple (*Malus × domestica* Borkh). The alkali bee (*Nomia melanderi* Cockerell) and the alfalfa leafcutter bee (*Megachile rotundata* (Fabricius)) are important pollinators managed by alfalfa growers and have been studied extensively in Washington (Menke 1954; Johansen *et al.* 1978; Eves *et al.* 1980). Bumblebees have been studied for pollination of red clover seed (Johansen 1960; Dade and Johansen 1962) and cranberries (Johansen 1967; Macfarlane *et al.* 1994). Other studies of native bees in Washington examined and related behaviors of *Anthophora urbana urbana* Cresson (Mayer and Johansen 1976), *Andrena vicina* Smith (Miliczky and Osgood 1995), and *Melissodes microsticta* Cockerell (Miliczky 2000).

Bee diversity on the Columbia Plateau is expected to be high. Stephen *et al.* (1969) estimated that 879 species occurred in northwestern North America, and Washington, Oregon, and Idaho formed the core of this region. Bees are thought to reach their greatest diversity in number of species in warm temperate, xeric regions (Linsley 1958; Michener 1979). Mountainous areas of moderate rainfall, varied floras, and soils suitable for ground nesting forms also support rich bee faunas (Linsley 1958). Washington offers large expanses of both types of habitat, especially the part of the state east of the Cascade Mountains. Here we document the species composition, distribution, and host plants of the native bees of southeastern Washington in the first comprehensive study of Washington's bee fauna.

MATERIALS AND METHODS

We sampled pollinator communities in three ecological regions of southeastern Washington: 1) The Snake River area is 15.3 ha located 21-26 km southwest of Pullman, WA

along the Snake River Road 5-8 km below the Wawawai railroad siding (T.36N-R.43E of quadrangle 57). The elevation ranged from 183-207 m and the area is Upper Sonoran Life Zone (St. John 1937). 2) The Colton area is a 11.3 ha original Palouse prairie vegetation area 21 km south of Pullman, WA (T.37N-R45E of quadrangle 57). The elevation ranged from 808-853 m and the area is Arid Transition Life Zone (St. John 1937). 3) Moscow Mountain is about 24 km northeast of Pullman, WA (T.39N-R5W of quadrangle 58) The sample area was on a 22.6 ha slope at the 1450 m level in the Canadian Zone (St. John 1937).

In each area we observed and collected bees from 15 June 1962 to 22 October 1962 and from 30 March 1963 to 20 June 1963. One collector made weekly trips to each site for a minimum of 8 h per day during the spring, summer and fall; a total of 34 collecting trips. The majority of collecting and observations were from 0730 h to 1730 h though we did occasionally collect and observe from dawn to dusk. Whenever possible, bee species identifiable in the field (*Bombus*, and some *Andrena* and *Anthophora*) were released to maintain the populations. Unidentified flowers were first given a site number. The bees and time of visitation were recorded in reference to this number and then plant specimens were collected for identification.

We used the direct searching method and insect nets to capture bees on flowers or in flight. We used the taxonomic system of Michener *et al.* (1994) and used LaBerge (1956a, 1956b, 1961), Stephen (1954), Stephen (1957), Stephen *et al.* (1969) and Thorp *et al.* (1983) to identify collected specimens. Most of the *Andrena*, *Mellissodes*, *Diadasia* and *Colletes* were determined by Wallace E. LaBerge. Voucher specimens for 89 species were deposited at the Insect Museum at Washington State University, Pullman, WA.

Plant names are those used by Hitchcock (1955), except for the majority of Compositae which are from St. John (1937). Flower specimens were compared with determined material in the Herbarium at Washington State University.

RESULTS

Six-hundred-and-seven bees were collected. The diversity of bee species was greatest at the Snake River site (18 genera, 64 species) followed by Moscow Mountain (14 genera, 54 species) and the Colton site (14 genera, 37 species) (Table 1). Six families of bees were found (Colletidae, Halictidae, Megachilidae, Andrenidae, Anthophoride and Apidae). Nineteen genera and 100 species occurred in the three areas. One genus of Colletidae, 4 genera of Halictidae, 5 genera of Megachilidae, 2 genera of Andrenidae, 6 genera of Anthophoride and 2 genera of Apidae (the honey bee (*Apis mellifera* L.) was not included) occurred in the study areas. One species of Colletidae, 11 species of Halictidae, 31 species of Megachilidae, 27 species of Andrenidae, 15 species of Anthophoridae and 15 species of Apidae occurred in the study areas.

Twenty-one families of plants (80 species) were identified as sources of nectar or pollen (usually both) for the visiting Apoidea (Table 1). The effect of elevation on host plant distribution and phenology was reflected in the distribution and capture dates of bee species at all three locations. *Osmia nanula* Cockerell was found in the middle of May at the lowest elevation but one month later at the mountain area. *Halictus ligatus* Say, *H. tripartitus* Cockerell, *Andrena prunorum* Cockerell and *A. opaciventris* Cockerell were also captured later in the season at higher elevations. This same phenomenon was also shown by the six most common *Bombus* species. Queens of all six species were observed by mid-April at the Snake River area, about 2 weeks later at the Colton area, except for *B. occidentalis* Greene, and at the Moscow mountain area about 4 weeks later.

Table 1

List of bee species collected from three specific areas in southeastern Washington.

S = Snake River area, C = Colton area, M = Moscow Mtn. area.

Family and Species	Area	Flowers visited
COLLETIDAE (1 sp.)		
Colletinae		
<i>Colletes californicus</i> Provancher	M	<i>Mertensia paniculata</i>
HALICTIDAE (11 spp.)		
Halictinae		
<i>Agapostemon cockerelli</i> Crawford	M	<i>Rudbeckia occidentalis</i> , <i>Cirsium arvense</i> , <i>Cirsium vulgare</i>
<i>Agapostemon texanus</i> Cresson	S, C	<i>Convolvulus</i> sp., <i>Medicago sativa</i> , <i>Helianthus annuus</i> , <i>Haplopappus</i> sp.
<i>Agapostemon virescens</i> (Fabricius)	S, M, C	<i>C. vulgare</i> , <i>Vicia</i> sp., <i>Helianthus annuus</i> , <i>Rosa</i> sp., <i>Gaillardia aristata</i> , <i>Epilobium</i> <i>angustifolium</i> , <i>Gentiana calycosa</i> , Compositae
<i>Halictus farinosus</i> Smith	S	<i>Lomatium</i> spp., <i>Malus</i> × <i>domestica</i> , <i>Brassica campestris</i> , <i>Sisymbrium</i> <i>attissimum</i> , <i>Helianthus annuus</i> , <i>Solidago</i> sp.
<i>Halictus ligatus</i> Say	S, M, C	<i>Helianthus annuus</i> , <i>Cirsium arvense</i> , <i>Solidago</i> sp., <i>Hapiopappus</i> sp.
<i>Halictus rubicundus</i> (Christ)	S, M	<i>Lomatium</i> spp., <i>Trifolium repens</i> , <i>Taraxacum officinale</i> , <i>Ranunculus</i> sp., <i>Cirsium arvense</i>
<i>Halictus tripartitus</i> Cockerell	S, M, C	<i>Lomatium</i> spp., <i>Rosa</i> sp., Compositae, <i>Solidago</i> sp., <i>Trifolium repens</i> , <i>Ranunculus</i> sp., <i>Taraxacum officinale</i> , <i>Collinsia</i> <i>parviflora</i> , <i>Cirsium arvense</i>
<i>Lasioglossum</i> spp. sen. s.	S, M, C	<i>Lomatium</i> spp., <i>Malus</i> × <i>domestica</i> , <i>Balsamorhiza sagittata</i> , <i>Potentilla</i> <i>gracilis</i> , <i>Helianthella uniflora</i> , <i>Trifolium repens</i>
<i>Lasioglossum</i> spp. (<i>Dialictus</i>)	S	<i>Lomatium</i> spp., <i>Malus</i> × <i>domestica</i> , <i>Gaillardia aristata</i>
<i>Lasioglossum</i> spp. (<i>Evylaeus</i>)	S	<i>Lomatium</i> spp., <i>Prunus avium</i> , <i>Malus</i> × <i>domestica</i> , <i>Prunus virginiana</i> , <i>Taraxacum</i> <i>officinale</i>
Rophitinae		
<i>Dufourea</i> sp.	M	<i>Phacelia heterophylla</i>
MEGACHILIDAE (31 spp.)		
Megachilinae		
<i>Anthidium emarginatum</i> (Say)	S	<i>Phacelia heterophylla</i>
<i>Anthidium utahense</i> Swenk	S	<i>Vicia villosa</i>
<i>Hoplitis albifrons argentifrons</i> (Cresson)	M	<i>Lupinus polyphyllus</i> , <i>Phacelia heterophylla</i>
<i>Hoplitis fulgida fulgida</i> (Cresson)	M	<i>Ranunculus</i> sp., <i>Delphinium nuttalliana</i> , <i>Physocarpus malvaceus</i> , <i>Phacelia</i> <i>heterophylla</i>
<i>Hoplitis hypocrita</i> (Cockerell)	S, M	<i>Balsamorhiza sagittata</i> , <i>Lomatium</i> spp., <i>Penstemon attenuatus</i>
<i>Megachile brevis</i> Say	S	<i>Solidago</i> sp.
<i>Megachile gemula</i> Cresson	M	<i>Physocarpus malvaceus</i>
<i>Megachile melanophaea calogaster</i> Cockerell	M	none

<i>Megachile parallela</i> Smith	S	<i>Helianthus annuus</i>
<i>Megachile perihirta</i> Cockerell	S, C	<i>Vicia villosa</i> , <i>Xanthium</i> sp., <i>Compositae</i> , <i>Solidago</i> sp., <i>Gaillardia aristata</i> , <i>Senecio</i> <i>serra</i> , <i>Cirsium vulgare</i> , <i>Cirsium arvense</i>
<i>Megachile pugnata</i> Say	S	<i>Erigeron speciosus</i>
<i>Osmia atrocyanea atrocyanea</i> Cockerell	S, M	<i>Malus</i> × <i>domestica</i> , <i>Balsamorhiza</i> <i>sagittata</i> , <i>Lupinus polyphyllus</i> , <i>Vicia</i> <i>villosa</i>
<i>Osmia brevis</i> Cresson	S, M	<i>Vicia villosa</i> , <i>Trifolium repens</i> , <i>Phacelia</i> <i>heterophylla</i>
<i>Osmia bruneri</i> Cockerell or <i>cobaltina</i> Cresson	S	<i>Penstemon lanatum</i>
<i>Osmia californica</i> Cresson	S	<i>Lomatium</i> spp., <i>Ribes aureum</i> , <i>Balsamorhiza sagittata</i> , <i>Gaillardia aristata</i>
<i>Osmia calla</i> Cockerell	S	<i>Vicia villosa</i>
<i>Osmia coloradensis</i> Cresson	M	<i>Trifolium repens</i> , <i>Arnica cordifolia</i>
<i>Osmia juxta juxta</i> Cresson	M	<i>Epilobium angustifolium</i>
<i>Osmia kincaidii</i> Cockerell	M	<i>Phacelia heterophylla</i> , <i>Collinsia parviflora</i>
<i>Osmia lignaria</i> Say	M	<i>Pyrus scopulina</i> , <i>Arnica cordifolia</i> , <i>Phacelia heterophylla</i>
<i>Osmia montana</i> Cresson	S	<i>Rosa</i> sp., <i>Gaillardia aristata</i>
<i>Osmia nanula</i> Cockerell	M, C	<i>Geranium viscosissimum</i> , <i>Ranunculus</i> sp.
<i>Osmia</i> nr. <i>nanula</i> Cockerell	S, M	<i>Vicia villosa</i> , <i>Trifolium repens</i>
<i>Osmia nemoris</i> Sandhouse	S, M	<i>Balsamorhiza sagittata</i> , <i>Arnica cordifolia</i>
<i>Osmia nifoata</i> Cockerell	M	<i>Pyrus scopulina</i>
<i>Osmia nigrifrons</i> Cresson	S	<i>Balsamorhiza sagittata</i> , <i>Vicia villosa</i>
<i>Osmia pentstemonis</i> Cockerell	S, M	<i>Penstemon albertinus</i>
<i>Osmia pikei</i> Cockerell	S	<i>Balsamorhiza sagittata</i>
<i>Osmia subaustralis</i> Cockerell	S	<i>Gaillardia aristata</i>
<i>Stelis</i> nr. <i>joederalis</i> Smith	M	none
<i>Stelis subcaerulea</i> Cresson	S, C	<i>Eriophyllum lanatum</i> , <i>Achillea millefolium</i>
ANDRENIDAE (27 spp.)		
Andrenina		
<i>Andrena amphibola</i> (Viereck)	C	<i>Agastache urticifolia</i>
<i>Andrena angustitarsata</i> Viereck	S, M, C	<i>Lomatium</i> spp., <i>Malus</i> × <i>domestica</i> , <i>Prunus</i> <i>virginiana</i> , <i>Pyrus scopulina</i> , <i>Rosa</i> sp., <i>Ranunculus</i> sp., <i>Physocarpus malvaceus</i> , <i>Rubus parviflorus</i>
<i>Andrena auricoma</i> (Smith)	M	<i>Potentilla</i> sp., <i>Achillea millefolium</i> , <i>Physocarpus malvaceus</i>
<i>Andrena caerulea</i> Smith	S, M	<i>Ranunculus</i> sp., <i>Prunus virginiana</i>
<i>Andrena candida</i> Smith	S	<i>Lomatium</i> spp., <i>Prunus avium</i> , <i>Balsamorhiza sagittata</i>
<i>Andrena chlorogaster</i> Viereck	M	<i>Physocarpus malvaceus</i> , <i>Potentilla</i> sp.
<i>Andrena crataegi</i> Robertson	M	<i>Physocarpus malvaceus</i>
<i>Andrena cressonii</i> Robertson	S, C	<i>Lomatium</i> spp., <i>Balsamorhiza sagittata</i> , <i>Rosa</i> sp., <i>Prunus virginiana</i> , <i>Geranium</i> <i>viscosissimum</i>
<i>Andrena helianthi</i> Robertson	S	<i>Helianthus annuus</i> , <i>Solidago canadensis</i>
<i>Andrena hemileuca</i> Viereck	M	<i>Pyrus scopulina</i>
<i>Andrena merriami</i> Cockerell	S, C	<i>Lomatium</i> spp., <i>Prunus avium</i>
<i>Andrena microchlora</i> Cockerell	S	<i>Lomatium</i> spp., <i>Malus</i> × <i>domestica</i> , <i>Ribes</i> <i>aureum</i>
<i>Andrena miserabilis</i> Cresson	M	<i>Physocarpus malvaceus</i>
<i>Andrena nigrocaerulea</i> Cockerell	C	<i>Geranium viscosissimum</i>
<i>Andrena nivalis</i> Smith	M	<i>Physocarpus malvaceus</i>

<i>Andrena pallidifovea</i> (Viereck)	S	<i>Eriophyllum lanatum</i>
<i>Andrena perarmata</i> Cockerell	S	<i>Lomatium</i> spp.
<i>Andrena pertristis carliniformis</i> Viereck & Cockerell	C	<i>Lomatium</i> spp.
<i>Andrena prunorum</i> Cockerell	S, M, C	<i>Lomatium</i> spp., <i>Sisymbrium attissimum</i> , <i>Philadelphus lewisii</i> , <i>Holodiscus discolor</i> , <i>Geranium viscosissimum</i> , <i>Physcarpus</i> <i>malvaceus</i>
<i>Andrena subsaustralis</i> Cockerell	M	<i>Balsamorhiza sagittata</i>
<i>Andrena subtilis</i> Smith	S, C	<i>Rosa</i> sp.
<i>Andrena topozana</i> Cockerell	M	<i>Cirsium arvense</i>
<i>Andrena trizonata</i> Ashmead	M	<i>Phycarpus malvaceus</i>
<i>Andrena vicina</i> Smith	S, M, C	<i>Phycarpus malvaceus</i> , <i>Rosa</i> sp., <i>Geranium</i> <i>viscosissimum</i> , <i>Holodiscus discolor</i> , <i>Rubus</i> <i>parviflorus</i>
¹ <i>Andrena</i> sp. E new sp.	S, C	<i>Balsamorhiza sagittata</i> , <i>Lomatium</i> spp.
Panurginae		
<i>Perdita lingualis</i> Cockerell	S, C	<i>Rosa</i> sp., <i>Geranium viscosissimum</i> , <i>Helianthus annuus</i>
<i>Perdita wyomingensis sculleni</i> Timberlake	S	<i>Holodiscus discolor</i> , <i>Achillea millefolium</i>
ANTHOPHORIDAE (15 spp.)		
Anthophorinae		
<i>Anthophora bomboides</i> Kirby	S	none
<i>Anthophora pacifica</i> Cresson	S, C	<i>Lomatium</i> spp., <i>Prunus armeniaca</i> , <i>Malus</i> \times <i>domestica</i> , <i>Syringa</i> sp., <i>Balsamorhiza</i> <i>sagittata</i> , <i>Ribes aureum</i>
<i>Anthophora ursina</i> Cresson	S	<i>Vicia villosa</i>
<i>Diadasia enavata</i> Cresson	S	<i>Helianthus annuus</i>
<i>Diadasia nigrifrons</i> (Cresson)	C	<i>Sidalcea oregana</i>
<i>Habropoda cineraria</i> (Smith)	S	<i>Physcarpus armeniaca</i> , <i>Malus</i> \times <i>domestica</i> , <i>Rosa</i> sp., <i>Ribes aureum</i>
<i>Melissodes agilis</i> Cresson	S	<i>Helianthus annuus</i> , <i>Gaillardia aristata</i>
<i>Melissodes lupina</i> Cresson	S	<i>Helianthus annuus</i>
<i>Melissodes metenua</i> Cockerell	C	<i>Haplopappus liatriformis</i>
<i>Melissodes rivalis</i> Cresson	C	<i>Cirsium vulgare</i>
<i>Melissodes robustior</i> Cockerell	S	<i>Helianthus annuus</i>
<i>Synhalonia actiosa</i> (Cresson)	S, C	<i>Balsamorhiza sagittata</i> , <i>Malus</i> \times <i>domestica</i> , <i>Prunus virginiana</i> , <i>Lupinus</i> sp., <i>Vicia villosa</i>
<i>Synhalonia edwardsii</i> (Cresson)	S	<i>Vicia villosa</i> , <i>Lupinus polyphyllus</i> , <i>Dipsacus sylvestris</i>
<i>Synhalonia frater</i> (Cresson)	S, M, C	<i>Balsamorhiza sagittata</i> , <i>Malus</i> \times <i>domestica</i> , <i>Syringa</i> sp., <i>Trifolium repens</i> , <i>Penstemon attenuatus</i> , <i>Brodiaea douglasii</i>
Xylocopinae		
<i>Ceratina acantha</i> Provancher	S, M, C	<i>Lomatium</i> spp., <i>Rosa</i> sp., <i>Penstemon</i> <i>triphyllus</i> , <i>Eriophyllum lanatum</i> , <i>Helianthus</i> <i>annuus</i> , <i>Geranium viscosissimum</i> , <i>Cirsium</i> <i>lanceolatum</i>
APIDAE (15 spp.)		
Bombinae		
<i>Bombus appositus</i> Cresson	S, M, C	<i>Phacelia</i> sp., <i>Balsamorhiza sagittata</i> , <i>Vicia</i> <i>villosa</i> , <i>Agastache urticifolia</i> , <i>Brodiaea douglasii</i>
<i>Bombus bifarius</i> Cresson	M, C	<i>Anaphalis margaritacea</i> , <i>Epilobium</i>

<i>Bombus californicus</i> F. Smith	S, C	<i>angustifolium</i> , <i>Rudbeckia occidentalis</i> , <i>Collinsia parviflora</i> , <i>Cirsium arvense</i> , <i>Phacelia</i> spp., <i>Sisyrinchium albus</i> , <i>Lupinus</i> <i>polyphyllus</i> , <i>Vicia villosa</i> , <i>Penstemon</i> spp.
<i>Bombus centralis</i> Cresson	S, M, C	<i>Vicia villosa</i> , <i>Sisyrinchium albus</i> <i>Epilobium angustifolium</i> , <i>Rosa</i> sp., <i>Rubus</i> <i>parviflorus</i> , <i>Malus</i> × <i>domestica</i> , <i>Geranium</i> <i>viscosissimum</i> , <i>Anaphalis margaritacea</i> , <i>Rudbeckia occidentalis</i> , <i>Collinsia</i> <i>parviflora</i> , <i>Sisyrinchium albus</i> , <i>Balsamorhiza sagittata</i> , <i>Lupinus</i> <i>polyphyllus</i> , <i>Trifolium repens</i> , <i>Mertensia</i> <i>paniculata</i> , <i>Dipsacus sylvestris</i> , <i>Vicia</i> <i>villosa</i> , <i>Agastache urticifolia</i> , <i>Penstemon</i> spp., <i>Brodiaea douglasii</i>
<i>Bombus fervidus</i> (Fabricius)	S, M, C	<i>Epilobium angustifolium</i> , <i>Rosa</i> sp., <i>Malus</i> × <i>domestica</i> , <i>Geranium viscosissimum</i> , <i>Anaphalis margaritacea</i> , <i>Rudbeckia</i> <i>occidentalis</i> , <i>Sisyrinchium albus</i> , <i>Medicago</i> <i>sativa</i> , <i>Balsamorhiza sagittata</i> , <i>Cirsium</i> <i>lanceolatum</i> , <i>Lupinus polyphyllus</i> , <i>Dipsacus sylvestris</i> , <i>Vicia villosa</i> , <i>Agastache urticifolia</i> , <i>Brodiaea douglasii</i>
<i>Bombus flavirons</i> Cresson	M, C	<i>Epilobium angustifolium</i> , <i>Cirsium arvense</i> , <i>Sisyrinchium albus</i> , <i>Helianthus annus</i> , <i>Dipsacus sylvestris</i> , <i>Vicia villosa</i> , <i>Agastache urticifolia</i> , <i>Penstemon</i> spp., <i>Castilleja</i> sp.
<i>Bombus griseocollis</i> (Degeer)	S, M, C	<i>Epilobium angustifolium</i> , <i>Rosa</i> sp., <i>Solidago</i> sp., <i>Phacelia</i> sp., <i>Sisyrinchium</i> <i>albus</i> , <i>Medicago sativa</i> , <i>Balsamorhiza</i> <i>sagittata</i> , <i>Helianthus annus</i> , <i>Lupinus</i> <i>polyphyllus</i> , <i>Vicia villosa</i> , <i>Penstemon</i> spp.
<i>Bombus mixtus</i> Cresson	M, C	<i>Epilobium angustifolium</i> , <i>Rudbeckia</i> <i>occidentalis</i> , <i>Collinsia parviflora</i> , <i>Phacelia</i> sp., <i>Sisyrinchium albus</i> , <i>Lupinus</i> <i>polyphyllus</i> , <i>Arnica cordifolia</i> , <i>Mertensia</i> <i>paniculata</i>
<i>Bombus nevadensis</i> Cresson	S, M, C	<i>Malus</i> × <i>domestica</i> , <i>Solidago</i> sp., <i>Phacelia</i> sp., <i>Medicago sativa</i> , <i>Balsamorhiza</i> <i>sagittata</i> , <i>Cirsium lanceolatum</i> , <i>Trifolium</i> <i>repens</i> , <i>Dipsacus sylvestris</i> , <i>Vicia villosa</i> , <i>Agastache urticifolia</i> , <i>Astragalus</i> sp., <i>Penstemon</i> spp., <i>Brodiaea douglasii</i>
<i>Bombus occidentalis</i> Greene	S, M, C	<i>Epilobium angustifolium</i> , <i>Rosa</i> sp., <i>Rubus</i> <i>parviflorus</i> , <i>Malus</i> × <i>domestica</i> , <i>Phacelia</i> sp., <i>Sisyrinchium albus</i> , <i>Medicago sativa</i> , <i>Balsamorhiza sagittata</i> , <i>Cirsium</i> <i>lanceolatum</i> , <i>Lupinus polyphyllus</i> , <i>Trifolium</i> <i>repens</i> , <i>Aconitium columbianum</i> , <i>Vicia</i> <i>villosa</i> , <i>Penstemon</i> sp., <i>Brodiaea douglasii</i>
<i>Bombus rufocinctus</i> Cresson	S, M	<i>Epilobium angustifolium</i> , <i>Geranium</i> <i>viscosissimum</i> , <i>Phacelia</i> sp., <i>Sisyrinchium</i> <i>albus</i> , <i>Brodiaea douglasii</i>
<i>Bombus vagans</i> Smith	M	<i>Sisyrinchium albus</i>
<i>Psithyrus insularis</i> (F. Smith)	C	<i>Epilobium angustifolium</i> , <i>Dipsacus</i>

<i>Psithyrus suckleyi</i> (Greene)	S, M	<i>sylvestris</i> , <i>Agastache urticifolia</i> <i>Epilobium angustifolium</i> , <i>Sisyrrinchium</i> <i>albus</i> , <i>Agastache urticifolia</i> , <i>Brodiaea</i> <i>douglasii</i> , <i>Senecio viscosissimus</i>
<i>Psithyrus variabilis</i> (Cresson)	M	<i>Epilobium angustifolium</i>

¹ Species E in the collection of Dan Mayer; yet to be described.

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